

SOME OBSERVATIONS ON LEGAL AND POLICY ISSUES IN REGARD TO SPACE DEBRIS

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KEYWORDS

The six United Nations Space Treaties and the obligation of States to consult.

United Nations General Assembly Resolution 47/68 of December 14, 1992 on NPS principles.

ILA Draft Proposal on Legal Instrument for the Protection of the environment, Of April 1992.

INTRODUCTION

The matter of space debris is, since some time, receiving increased attention also outside the strictly scientific community.

Accidents with spacecraft like the Salyut 7/ Kosmos 1686 in 1991 have not only been discussed in leading journals and magazines but have also, of late, been formally presented to the United Nations, in particular to the Legal Sub-Committee (UN Doc., 21.2.91) of the Committee on the Peaceful Uses of Outer Space.

Though the United Nations would, in view of its character as an international organization of which almost all States of the globe are members, seem the foremost forum to have taken the lead in the matter of space debris, or of the pollution of outer space in general, this has, so far, not been officially done.

The United Nations has, however, since 1978, discussed the space debris-related item of the use of nuclear power sources (nps) in outer space, to the effect that, in 1992, a set of principles on the use of such sources was finalized in United Nations General Assembly Resolution 47/68, of December 14, 1992. These principles are in the form of a resolution, which makes them legally non-binding for the member States of the United Nations.

The item of space debris has, however, not yet even reached the status of being an agenda item, either on that of the United Nations General Assembly, or on that of the United Nations Committee on the Peaceful Uses of Outer Space. In view of the evidence presented during the present conference, it would seem that States members of the United Nations are well-equipped to request the United Nations General Assembly to put the matter of space debris on one of its forthcoming agendas. In fact, national USA law opened, in 1990, the possibility to internationally undertake activities in this respect in the United Nations.

Space debris being a detrimental result of spaceflight, and spaceflight having been regulated in six internationally-accepted treaties, a review of some of those treaties (OST67; LC71; RC76; MA79) reveals that various provisions refer to detrimental consequences of activities of States in outer space. These will be discussed in paragraph 1 hereinafter.

Secondly, the International Law Association (ILA) has, in 1992, come up with a draft legal instrument concerning the protection of the environment from damage as a consequence of space activities. The ILA is an association consisting of lawyers with an interest in, or expertise of, international law. The members are grouped in national branches; the headquarters of ILA are in London/England. ILA has no expertise in matters of activities in space from the natural sciences point of view, a fact which was of some influence on the formulation of the 1992 ILA draft legal instrument just mentioned, which will be discussed in paragraph 2 hereinafter.

Most activities of States in the prevention of space debris creation, and in general of the prevention of the pollution of outer space have, so far, been undertaken by individual States like Japan, the USA, and, in Europe, by member States of ESA, mainly so in the scientific and technical area. In formalizing this scientific exchange of data and consultations in a formal co-operation between the USA, Japan and ESA, a new international custom has been established that may, in future, lead to an internationally-adopted legal instrument serving to mitigate existing pollution of outer space in general and to prevent space debris-creation in particular.

The implications of the above will be discussed in paragraph 3 hereinafter.

1. SOME SPACE TREATY PROVISIONS AND THEIR IMPLICATION.

1.1. In article I of the basic space treaty, the Outer Space Treaty 1967 (OST67), paragraph 1, refers to the utilization of outer space '... for the benefit and in the interests of all countries ...'. It can hardly be maintained that pollution of outer space, including the creation of space debris, is beneficial to outer space or to the

earth, or that such creation is in the interests of all countries. Space science and technology are in the process of developing special alloys so as to prevent debris impact of spacecraft, which process may be regarded as one of the precautionary measures required from States under international law, should they intend to put forward (a) claim(s) of compensation for damage to object(s) launched into outer space under their jurisdiction and control (see article VIII OST67).

Apart from damage by space debris to objects launched into outer space, an important question remains: that of the protection of outer space as an area. None of the existing six space treaties provides for the protection of outer space as an area independent of its utilization. Furthermore, the scope of the present pollution of outer space, including by space debris, also seems an infringement on the provision of article IX OST67 that in the utilization of outer space States '.... shall conduct their activities in outer space ....' with due regard to the corresponding interests of States. Article IX OST67, further, provides for the legal obligation of States ('shall') to undertake 'appropriate international consultations before proceeding' with an activity or experiment planned by it or its nationals in outer space (including the moon and other celestial bodies) [which] would cause potentially harmful interference with activities of other States.

This is to say that the basic treaty in regard to the utilization of outer space, the Outer Space Treaty of 1967, is, though generally-worded, well provided for the prevention of the further pollution of outer space. It is, however, a matter of States' practice, that is, the way in which States actually behave in the matter of spaceflight, to stem, and to prevent, pollution of outer space. As said hereabove, with the advent of consultations between ESA, NASA and NASDA, the requirement of consultation has been met. These consultations have, however, not been undertaken prior to spaceflight, and recent surveys of launches (COSPAR Bulletins, quarterly) are proof that no State has exercised self-restraint based on consultation in its number of launches: in spite of an increased awareness of the increase of space debris and similar environmental hazards, launches continue at an only slightly decreased level of one launch every three or four days as compared with one launch every three days a few years ago (COSPAR Bulletins, quarterly).

If mitigation of space debris creation has become, or soon will become, a necessity for the continuation of spaceflight, it thus is up to the launching States to take into consideration article IX OST67 on the practical level too, as one means to mitigate space debris.

1.2. Each State Party to the Registration Convention of 1975 (RC75) is under the legal obligation to register its launching of an object into earth orbit or beyond (article II RC75). Such registration must be taken into the national registry of the State of registry as well as in that of the Secretary-General of the United Nations. Additionally, each State of registry may, from time to time, provide the Secretary-General of the United Nations with additional information concerning a space object carried on its registry (Article IV, paragraph 2, RC75). It should be emphasized that this latter provision does not contain a legal obligation - States are free ('may') to provide such information, or

not.

One step forward in the direction of a complete survey of existing, or the imminent creation of, space debris, might be that States, though not -yet- legally obliged to present the said information, voluntarily register all changes occurring to the object launched into outer space under their jurisdiction and control. Until the present, States were not prone to that behaviour; especially not if nuclear power sources were to be utilized in outer space, as the COSMOS-954 accident in 1978 showed, and the Apollo-flights to the moon between 1969 and 1972 have proved. Hazardous payload, or hazardous missions, if not suitably registered in the sense of article IV RC75, and if creating an accident in outer space, in the terrestrial atmosphere or on earth, would thus make the launching authority in question internationally liable, and thus held to compensate for damage occurred. The survey thus established might lead States, international organizations (e.g. the United Nations) and private entities to enhanced awareness of the space debris matter in particular.

1.3. One central issue in the debates on the pollution of outer space is that of liability for damage to property of States in space and on earth. Article 1.a. of the Liability Convention of 1971 (LC71) defines damage as 'loss of life, personal injury or other impairment of health; or loss of or damage to property of States or of persons, natural or juridical or property of international intergovernmental organizations'. Thus, the LC71 restricts 'damage' to human beings and property - it excludes such important issues as all other forms of life on earth or in the near universe, and even outer space as an area. In view of the scope of the present pollution of outer space, a revision of the term 'damage' as defined in the late 1960's and early 1970's, and laid down in the Liability Convention 1971, seems unescapable. In this context, article XXVI LC71 deserves attention, as it provides that '.... at any time after the Convention has been in force for five years [it entered into force on September 1, 1972] and at the request of one third of the States parties to the Convention .... a Conference of the States Parties shall be convened to review this Convention.'. Though it seems politically unlikely that the LC71 will shortly be re-opened, States parties to the LC71 might feel obliged to informally, that is without endeavours to re-open the LC71, discuss the definition of 'damage' so as to come to an agreement in regard to a more extensive interpretation of the term 'damage', to the effect that that definition be extended also to - outer space as an area, and - other forms of life (than that of human beings) on earth.

One possible means to activate States, international organizations and private entities to mitigate space debris, and the pollution of outer space in general, is the legal figure of risk liability. Risk liability as proposed here encompasses liability for damage without necessity of proof of fault, or gross negligence, or of an act or omission done with intent to cause damage. This type of liability would lead to implied liability and the obligation to indemnify or compensate for damage as a consequence of each launch, for each launching authority and for all detrimental consequences of the launch, including

indirect ones (e.g. radio-active radiation of an nps debris).

A second proposal concerns the creation of an international fund (Reijnen, 1989; Hurwitz 1991), consisting of -mandatory- contributions by each launching authority prior to every launch, the contributions to the fund to be a fixed amount of money proportional to the size and mass of the object to be launched, as well as to the estimated hazardous nature of the said object. The creation of such a fund might lead to less launchings; to a means to cover the expenses of, to start with, clean-up operations in space as soon as possible, and also as a means to indemnify States for damage to their property in space and on earth.

The idea of such a fund is not new or revolutionary; it found a footing in two conventions regarding the law of the sea, in, e.g.:

- the International Convention on Civil Liability for Oil Pollution Damage, of 29.11.69 (ILM,1970), and
- the International Convention on the Establishment of an International Fund for Compensation of Oil Pollution Damage, of 18.12.71 (ILM,1972).

Also, in space law literature, as early as 1960 (Cooper, 1960) the creation of such a fund was proposed. More recently (e.g. Hurwitz, 1991 ; Reijnen/De Graaff, 1989) the idea of such a fund again emerged.

It is submitted that the establishment of new conventions, along the lines of those for the law of the sea just discussed, but regarding compensation for space pollution damage, be considered by the scientific and international law community. Scientific expertise, the awareness of the seriousness of the pollution of outer space in international law fora, as well as already existing international consultations seem to have been sufficiently developed, for States and international organizations to undertake this task.

1.4. The general provisions contained in article IX OST67 (see paragraph 1.1. herebefore) as regards prevention of, in general, adverse changes in the space environment, have been repeated in the only specific treaty in regard to outer space so far, the Moon Agreement of 1979 (MA79), article 7 paragraph 1. According to that article, States are under the legal obligation to take measures 'to prevent the disruption of the existing balance of its environment...'. Between 1969 and 1972, several US Apollo flights took place to the Moon; also the former USSR left vehicles on the Moon which are no longer functioning. Thus, space debris is present on the Moon since a long time, including nuclear devices left there by the Apollo crew. The MA79 having been ratified by nine States, none of these States being capable at present to undertake another flight to the Moon or Mars it has, since its entry into force on July 12, 1984, been subject to severe criticism.

The ius cogens character of the Ma 79 has, by some authors and most States, been stated to be doubtful. One of the reasons why States find it difficult to ratify the MA79 is article 11 MA79, providing, for the first time in space law, an international regime to be mandatorily established prior to any exploitation of the natural resources of the Moon.

Article 11 MA79 is organically connected with article 18 MA79, which provides that ten years after the entry into force of the MA79 -hence in 1994- the question of the review of the Agreement must mandatorily ('shall') be included in the provisional agenda of the United Nations General Assembly, to consider whether it requires revision.

In the years after 1994 and provided the MA79 will be reviewed in the sense of article 18 MA79, the matter of the pollution of outer space, and in particular of the Moon, by space debris past, present and possibly future in view of the US plans to return to the Moon and Mars, might be included in the review discussions.

## 2. POLICY IMPLICATIONS IN REGARD TO SPACE DEBRIS MITIGATION

It follows from paragraph 1 hereabove that several proposals can be made for a future policy to mitigate existing space debris and to prevent the creation of further space debris.

One of the main issues prevention a clear view in the legal context is that there is no definition of the terms 'space debris', 'pollution', 'contamination' and similar terms generally accepted by the international law and international space law community.

Several attempts have been made; most recently by the ILA. Their -still- unsatisfactory- definition is as yet under discussion in ILA and ESA's SDAG. The present author herewith submits a definition (contained in annex 1 to this paper) proposal, which proposal has also been included in the official proposal to ILA by the Dutch branch of ILA.

Secondly, the official co-operation begun between ESA member States through SDAG with NASA and NASDA could be extended to all spacefaring States, such in view of the scope of the global character of the space debris issue.

International organizations active in or related to spaceflight in any direction, e.g. ITU, WMO, ICSU and its branches, COSPAR, IAF, UNCOPUOS, need to be involved scientifically, as well as politically and from the legal point of view. The international organization par excellence, the United Nations, is since 1959 well-provided for, and through UNCOPUOS, active in, all matters concerning the utilization of outer space. It would seem that the global matter of space debris be discussed in the various United Nations gremia responsible for environmental matters, and in UNCOPUOS in particular.

ESA as an international organization, and its member States, have preliminarily negotiated in UNCOPUOS the recently-concluded nps principles in United Nations General Assembly Resolution 47/68 of December 14, 1992. It would seem a step forward if, also in UNCOPUOS, a set of principles be envisaged to govern the mitigation of space debris. A first step in this direction was already put by the USA in 1990 when US Congress declared (Public Law 101-611, of November 16, 1990, 104 Stat. p. 3203) - see annex 2 to this paper.

Thirdly, on the international space law side, existing space treaties contain various articles the effectuation of which by States Parties might lead to space debris mitigation.

Two central issues come to mind:

- the obligation of States to consult (article IX

OST67), and  
 - the present definition of the term 'damage' (article 1.a. LC71) which evidently insufficiently covers the actual pollution of outer space, by space debris and otherwise; it is, consequently, open either to revision or to a generally-accepted extensive interpretation according to the ideas submitted in 1.3. herebefore.

The draft ILA proposal of 1992, if finalized and concluded, would be a pivotal support from the public international law side. In view of its central position in space science, ESA member States and space debris experts in the SDAG may be in a position to formulate a European policy and legal context as regards the European considerations for the mitigation of the pollution of outer space in general and by space debris in particular.

#### CONCLUSION

Existing space treaties provide for the conduct of States in the utilization of outer space as well as for the prevention of space debris. State practice over the last 35 years has shown that that conduct has led to a large-scale pollution of outer space, such in spite of the strong normative value of article IX OST67 and various other treaty provisions like, e.g., article IV paragraph 2 RC75 for States to provide additional information deemed appropriate.

A central issue is the proposed revision, or re-interpretation, of the term 'damage' (LC71, article 1.a.). Though it seems politically unlikely that the LC71 will shortly be reopened, States Parties to the LC71 might feel obliged to informally discuss, and come to an agreement about, a more extensive interpretation of the term 'damage', so as to also include outer space as an area and other forms of life (than human beings) on Earth. If done, the term 'damage' would have to be strongly lined with an additional kind of liability for damage, viz. liability of States for injurious consequences (e.g. space debris) out of acts not prohibited by international law (e.g. spaceflight), or risk liability.

More pragmatic than risk liability introduction seems the creation of an international indemnification fund to which each State contributes proportional to the size, mass and potential hazards of the launch prior to the launch. The idea of such a fund has been put into practice in the law of the sea, with the establishment, in 1971, of an international Convention on the Establishment of an international fund for compensation of oil pollution damage (of 18 December 1971).

On the policy side, the international law community has undertaken several attempts to draft an international legal instrument for the protection of outer space from space debris. One of these is the 1992 ILA proposal containing many useful draft articles but which, obviously, still struggles with definitions elementary for a treaty text, viz. those of 'space debris', 'pollution', 'contamination' and the like.

Another one regards the recently-concluded United Nations General Assembly Resolution 47/68, of 14 December 1992, on principles regarding the use of nuclear power sources in outer space. In particular principle 3 of the said Resolution

provides a pragmatic approach to the issue involved and might serve in negotiating the space debris issue.

US national law provided, in 1990, that 'the US should engage other spacefaring nations to develop an agreement on the conduct of space activities that ensures that the amount of orbital debris is not increased' (Public Law 101-611, November 16, 1990, 104 Stat. 3203), thus offering the USA an excellent opportunity to begin debates in UNCOPOUS. Though ESA, or its member States, do not have national or ESA legislation proposals of the type just quoted, a solid political basis for the creation of such legislation is available and operational in and through ESA's SDAG.

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- OST67 = Treaty on Principles governing the Activities of States in the Exploration and Use of Outer Space, entered into force on October 10, 1967
- LC71 = Convention on International Liability for Damage caused by Space Objects, entered into force on September 1, 1972
- RC75 = Convention on Registration of Objects launched into Outer Space, entered into force on September 15, 1976
- MA79 = Agreement governing the Activities of States on the Moon and other Celestial Bodies, entered into force on July 12, 1984.
- Text of article IX OST67:  
 In the exploration and use of outer space, including

the moon and other celestial bodies, States Parties to the Treaty shall be guided by the principle of co-operation and mutual assistance and shall conduct all their activities in outer space, including the moon and other celestial bodies, with due regard to the corresponding interests of all other States Parties to the Treaty.

States Parties to the Treaty shall pursue studies of outer space, including the moon and other celestial bodies, and conduct exploration of them so as to avoid their harmful contamination and also adverse changes in the environment of the earth resulting from the introduction of extraterrestrial matter and, where necessary, shall adopt appropriate measures for this purpose. If a State Party to the Treaty has reason to believe that an activity or experiment planned by it or its nationals in outer space, including the moon and other celestial bodies, would cause potentially harmful interference with activities of other States Parties in the peaceful exploration and use of outer space, including the moon and other celestial bodies, it shall undertake appropriate international consultations before proceeding with any such activity or experiment. A State Party to the Treaty which has reason to believe that an activity or experiment planned by another State Party in outer space, including the moon and other celestial bodies, would cause potentially harmful interference with activities in the peaceful exploration and use of outer space, including the moon and other celestial bodies, may request consultation concerning the activity or experiment.

#### Text of article 1.a. Liability Convention 1971:

For the purposes of this Convention

(a) The term 'damage' means loss of life, personal injury or other impairment of health; or loss of or damage to property of States or of persons, natural or juridical or property of international intergovernmental organizations;

#### ANNEX 1:

Proposal for definitions:

- a - 'contamination' means an infection with a contagious disease by man, of outer space
- b - 'pollution' means any introduction by man into outer space of man-made material with detrimental consequences for outer space as an area and natural celestial bodies
- c - 'debris' means any man-made earth-orbiting object which is non-functional, and with no reasonable expectation of assuming or resuming its intended function or any other function for which it is or can be expected to be authorized, including fragments thereof and parts thereof. Orbital debris includes non-operational spacecraft, spent rocket bodies, material released during planned space operations, and fragments generated by satellite and upper stage break-up due to explosions and collisions
- d - 'geostationary orbit' means a circle in the plane of the earth's equator at an altitude of 35786 km above it
- e - 'damage' means loss of life, personal injury or

other impairment of health, or loss of or of damage to property of States and of persons, natural or juridical, or property of international intergovernmental organizations. Damage to areas beyond national jurisdiction is equally included.

(proposed by Dr. Bess Reijnen, 1993).

#### ANNEX 2:

Public Law 101-611, November 16, 1990, 104 Stat. 3203:

#### 'Sec. 118 Space Debris

- (a) Findings. - The Congress finds that-
  - (1) if space users fail to act soon to reduce their contribution to debris in space, orbital debris could severely restrict the use of some orbits within a decade;
  - (2) the lack of adequate data on the orbital distribution and size of debris will continue to hamper efforts to reduce the threat that debris poses to spacecraft; and
  - (3) existing international treaties and agreements are inadequate for minimizing the generation of orbital debris or controlling its effects.
- (b) Sense of Congress. - It is the sense of Congress that the goal of United States policy should be that -
  - (1) the space related activities of the United States should be conducted in a manner that does not increase the amount of orbital space debris; and
  - (2) the United States should engage other spacefaring Nations to develop an agreement on the conduct of space activities that ensures that the amount of orbital space debris is not increased.'